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## ORIGINAL ARTICLES.

### ADVANTAGES AND DISADVANTAGES OF GLASSES IN RAILWAY SERVICE:

APPENDED REPORT OF THE OPINION OF OPHTHALMOLOGISTS  
THROUGHOUT THE UNITED STATES AS TO THE SAFE-  
NESS OF AN EMPLOYEE REQUIRING THEIR USE.\*

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MILWAUKEE, WIS.

THE question of enginemen and firemen wearing glasses while operating limited trains, was very forcibly brought to my attention by a committee of the advisory board of the Brotherhood of Locomotive Engineers, asking for an opinion as to the safeness of an employee who had been many years an engineman, and who on re-examination for vision had failed to come up to the required standard. With glasses his vision was brought up to this standard, there being no ocular disease.

From an experience of riding considerably over six thousand miles in the cabs of engines, in all kinds of weather and at all times of the day and night, the following opinion was unhesitatingly given:

"It is my professional opinion that a railroad employee (engineman or fireman) who has been in continued service for a period of not less than five years and who on re-exam-

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ination falls below the required standard of vision, and such vision can be brought up to said required standard with glasses, his color perception meeting the required standard and there being no ocular disease, *is a safe employee.*

"Such employee should be required to carry at least one extra pair of glasses.

"Such employee should be re-examined semi-annually to ascertain if there has been a further decrease in vision and if the glasses fully correct the visual defect."

It is a well known fact that men entering into railway service at from eighteen to twenty-five years of age may possess from 1-4 D. of latent hypermetropia and considerable astigmatism, and be able to pass the required examinations, as they are now conducted, with ease, the muscle of accommodation being able to overcome the latent refractive error. These men on coming up for re-examination five, ten and fifteen years later will be unable to meet the required standard of vision because of a reduction in accommodative power with increasing years. They are at their most useful time of life in all other respects, their experience resulting from long years of training and the caution acquired with advancing years, more than compensates for the loss in vision, and when it can be brought up to the standard required with glasses, renders them far more useful and safe men than those with perfect eyesight and less experience.

With the vision of these men raised to the required standard and protected from wind, dust, mist, snow and sleet by glasses, it stands to reason they are safe men, safer in fact than the man with standard vision, less experience and unprotected eyes.

The objections raised to enginemen wearing glasses are not many, but on first thought may seem serious.

1st, Becoming smeared and dirty.

2nd, Becoming covered with fog, mist, rain or snow.

3rd, Becoming fogged on coming from cold into warmth.

4th, The danger of glasses being broken.

5th, "That glasses which give a visual acuity of  $\frac{20}{20}$  in the examining room do not give an equivalent visual acuity of  $\frac{20}{20}$  when used at very long ranges, particularly under certain climatic conditions."

6th, The legal aspect in case of accident.

1st. As to the glasses becoming smeared, there is no doubt they do become very dirty. Those of you who wear glasses should try the experiment of smearing your glasses or moistening them and let them become covered with dust and see what effect it has on objects  $\frac{1}{4}$  to 1 mile distant. It does interfere with vision for reading or viewing any object within 18 inches distance, but the signals must be observed at a distance of from 100 feet to  $1\frac{1}{2}$  miles. The same fact applies in looking through a very dirty window; objects near at hand are indistinct, but the view of those a long distance away is hardly interfered with. The principle is that of looking through a pin-hole disc—one can see distant objects distinctly but near objects can not be made out. The dirt on glasses is not evenly distributed over their surfaces; innumerable small areas are clear, and through these small areas, as with the pin-hole disc, a large field at long distance is observed.

2nd. Practically the same may be said regarding the glasses becoming covered with fog, mist, rain or snow; through the small areas not covered with the moisture one can see distinctly as far as the atmospheric conditions will permit with the unprotected eye, if not farther. Dr. Wm. Cheatham speaks of using soap to prevent lenses fogging the same as we use on laryngeal mirrors to prevent its occurrence. H. H. Seabrook refers to the use of the "lasin" pencil to prevent fogging and also as a water-proof. With these substances it has been fully demonstrated that lenses can be kept fog and moisture free.

3rd. The question of fogging, as Dr. Young<sup>1</sup> says, "may be dismissed if we only stop to consider that fogging only occurs when going from a cold air into a warm one." My experience in an engine cab has been that glasses so fogged are perfectly clear in less than five seconds on putting the head out of the window and coming in contact with the cold air again. This fogging interferes with the engineman seeing distinctly the various mechanisms about the cab for a few moments, but he is equally unable to see for the same length of time as a result of coming in contact with snow, sleet, rain and wind with the unprotected eyes.

4th. The danger of glasses becoming broken when in position on one's face is almost nil. I can recollect of only one instance—a young man was struck in the face with a billiard cue and rimless glasses broken. A blow sufficient to break rimmed glasses on the wearer's face would in all probability be enough to completely disable him from continuing with his work. Dr. Chas. Lukins<sup>2</sup> in a report of 76 cases of perforating wounds of the eyeball says, "broken spectacles were responsible for two cases, a blow having shattered the glasses and driven a fragment through the tunics of the eye."

5th. That glasses which give  $\frac{20}{20}$  vision in the examining room do not give an equivalent vision when used at long distances is referred to by F. Ard and Geo. de Schweinitz (see appended answers). However, if a man's vision in the examining room is found to be reduced to say  $\frac{20}{40}$  in each eye, or  $\frac{20}{70}$  in one eye and  $\frac{20}{50}$  in the other, and can be brought up with glasses to  $\frac{20}{20}$  in each eye separately, "he certainly is safer as an employe with his refraction properly corrected than he would be without such correction."

6th. That vision is better without correcting lenses in dusk or darkness, is asserted by well known authorities.

Dr. W. Harvey Smith says "I believe it is the experience of most wearers of glasses, especially of persons who have not marked deterioration of vision, that in semi-darkness or at dusk vision is better without than with correcting lenses." He explains the condition as follows: "I believe the explanation of the phenomenon mentioned is, that rays of light passing from a rare into a denser medium undergo some retardation of their progress. The amount of retardation depending upon the density and character of the medium and the quality and intensity of the light. Further, the position and direction in which lenses are worn before the eyes must have an important bearing upon the point raised in my recent communication to you."

Dr. J. A. White writes: "As to the matter which I bring up of a person of  $\frac{20}{40}$  or  $\frac{20}{60}$  vision seeing better without glasses at night than in the day, you ask me for an explanation. I can not give you any; I have been puzzled over the thing for a long time and can not understand it.

"First, to start with myself, I have a vision in the right eye of  $\frac{20}{20}$ , in the left of  $\frac{20}{40}$ , simple hyperopia, all of which I have developed since I was 45 years of age. Prior to that it was latent. My glasses give me  $\frac{20}{10}$ . Now at night, out of doors, I see better without my glasses; the darker the place the better I see without them. Where there is bright electric light, I see better with the glasses. I read your note last evening, and in walking up town some distance I took particular pains to test my glasses, and except in the brightly illuminated places I saw much better without them. Several blocks off I noticed there were some red and white lights to show some street repairs that were going on. My glasses enabled me to see these lights more sharply defined in outline, but no better. Without the glasses they were stellate in appearance.

"As I never heard any reference to this matter, I thought it was my own peculiarity for a long time, but after questioning a great number of people on the subject and since their attention has been called to it, they state they find the same thing. I passed through Philadelphia the other day and my niece, who is a patient of Dr. de Schweinitz, happened to make the remark that she saw much better without her glasses at night than she did with them. She has hyperopic astigmatism. My assistant hearing me dictating this letter to you, remarked that he thought everybody was that way; because he has worn glasses for a long time and practiced medicine in the country, and says that when driving at night he always took his glasses off because he saw better without them. I don't know whether this has any dependance on the pupillary action with or without glasses on; I have never investigated it closely and have no theory to advance. At the same time, it is a matter for consideration for enginemen on the railroad."

Dr. H. B. Young states:<sup>1</sup> "The lamp signals stand out better with  $\frac{20}{40}$  than with  $\frac{20}{20}$ . This is explained when one considers that with  $\frac{20}{20}$  the effulgent rays can be made out. These effulgent rays give a twinkling, unsteady effect, which is still further accentuated by the jolting of the engine. With  $\frac{20}{40}$  these effulgent rays are blotted out and the lamps stand out as illuminated discs." This was also my experience.



At the much lessened distance I could make out the lights with  $\frac{20}{40}$  (6/XII) V., but I could make them out much more clearly and at a much greater distance with  $\frac{20}{20}$  (6/VI) V., as cited above; and again, if there were a number of lights displayed, as are usually seen in railroad yards, the proximity of these illuminated discs was very confusing.

As everything in the universe is seen by reflected light, excepting self-luminous objects, my idea as to the diminution of vision observed by wearers of glasses after dark, is that the lenses reflect so much of the small amount of light coming from these various objects after nightfall as to make a decidedly noticeable diminution in the vision. Also there is some absorption by the denser medium of the glass, as Dr. Smith suggests. There is so much light in the day time that this loss from reflection and absorption is unnoticed. Dr. White states his glasses enable him to see the lamps in the street more sharply defined in outline. As night signals for railroads are self-luminous objects, the question of diminution after dusk cannot be considered an objectionable factor against glasses.

7th. The legal aspect in case of accident was brought up by A. E. Manchester, Superintendent of Motive Power, Chicago, Milwaukee & St. Paul R. R., i. e.: "There is a general feeling that a man wearing glasses has not as good general eyesight as one who sees without glasses, and in case of accident lawyers take advantage of every point of this kind and make it unjustly embarrassing and sometimes expensive to the company. The one thing that will overcome this feature will be that conventions of oculists and men who are expert in this calling will take the position that a man's eyesight is as good or better when the man is provided with glasses that bring his eyesight to normal, than is a man without them. If this cannot be done, there is always a question of hazard to the company in having men in the service who wear glasses."

From my experience too much cannot be said in favor of enginemen and firemen wearing glasses, either for protection or when long in service, to correct refractive errors.

The following are some of the distinct advantages of glasses:

1st, The correction of refractive errors of men long in service.

2nd, Protection against wind, dust, mist, rain, snow and sleet.

3rd, Relieving the reflection when running beside rivers or lakes, from snow in the winter and sand in western deserts.

4th, Overcoming the disturbance of vision when running toward the rising or setting sun.

5th, Doing away with the heat and glare from the fire-box in stoking.

The men who make the fast runs with our "limited" trains, have been advanced to such duties by a process of selection, a sort of "survival of the fittest." The experience attained, ability to meet the increasing demands of his occupation, and the additional caution acquired, are all results of his long years of service, and in reality are what have secured him his position and entitled him to hold it. *These qualifications without good vision endanger life and property*, but with his vision brought up to the required standard by the use of lenses, he has the knowledge that his past record has entitled him to the respect and trust of the officials of his road to spur him to the best performance of his duties.

The protection afforded the eyes by glasses against the impact of wind, dust, rain, snow and sleet, when an engine is travelling from 35 to 70 miles an hour, can only be appreciated by one who has experienced it, and it is absolutely necessary for an engineman to have his head out of the cab window more or less, in order to be sure of his signals in such weather conditions. Fully 90 per cent. of the enginemen I have ridden with carry some sort of protection glasses for such emergencies.

The objectionable reflection from snow, and while running beside bodies of water, the disturbance of vision when running toward the rising or setting sun, and the relief from the heat and glare of the fire-box, is naturally accomplished by use of colored lenses. All colors were tried; the best and only satisfactory result was obtained with the amber lenses. With this color before the eyes there is a seeming, if not absolute increase in the vision. Objects of like hue at a distance stand out distinct and plain—for instance a semaphore

signal with a bad background. One can look indefinitely into the fire-box and see all its parts, relieved of the heat and glare, and then climb up on the cab seat and distinguish signals with ease, the scotoma produced by looking into the bright fire with the naked eye being absent.

The protection of firemen's eyes seems of especial importance to me for the reason that the engineman almost always calls on his fireman to verify signals located at points of importance or where the signal is somewhat obscure; and with the scotoma produced in the naked eye from the fire-box this is almost impossible.

The colors of the night signals used in railroading that have to be recognized at a distance—red, white, green and yellow—are not affected by the amber lens to any extent. The white is tinged a slight yellow; the yellow is made a deeper yellow; the green, especially if it contains much blue in its composition, is made a more decided green on account of the yellow in the amber being a complimentary color of the blue and neutralizing same. The red is absolutely unaffected. The blue lights used for back lights, and on some roads to designate car repairing, are considerably diminished by the amber lenses, but this color is not used for the control of trains in block systems. The blue and violet rays of the spectrum are the chemically active rays and the ones which cause irritation of the fundus and diminution of vision when the eyes are exposed to them for any length of time. The amber lenses neutralize these rays and so protect the eyes from them.

Col. Sam. Reber of the signal corps, U. S. A., in a recent conversation spoke of the increase in vision obtained by the use of amber eye-pieces in field glasses, especially on bright days with a blue sky for a background or a bluish haze; the distant objects were made to stand out sharp and distinct. Through the kindness of F. A. Hardy & Co. I have obtained a pair of these, and the difference in vision with them is quite marked.

In order to obtain the opinions of ophthalmologists throughout the United States as to the safeness of a railroad employee wearing glasses, the following circular letter was sent out:



“MILWAUKEE, WIS., March 16, 1905.

“DEAR SIR:

“The constantly occurring railroad accidents have caused considerable activity along many lines, with a view to provide greater safety to passengers, employees and property.

“With the present method of controlling trains by signal, block, and otherwise, the vision and color perception of a railway's employees is of the greatest importance.

“Considerable discussion has arisen as to the use of glasses by *old employees* while on duty, especially enginemen and firemen.

“A short time ago I was asked for an opinion as to whether an old employee, whose vision on re-examination falling below required standard, there being no ocular disease, color perception meeting requirements, and glasses bringing vision up to the required standard, could be considered a *safe employee*.

“The following opinion was unhesitatingly given, as a result of the experience in riding considerably over 6,000 miles in the cab of an engine, at all times of the day and night, in all kinds of weather, with and without glasses. (See paper read before the Ophthalmic Section A. M. A., *Jour. A. M. A.*, Feb. 18th, 1905):

“It is my professional opinion that a railroad employee (engineman or fireman) who has been in continued service for a period of not less than five years and who on re-examination falls below the required standard of vision, and such vision can be brought up to said required standard with glasses, his color perception meeting the required standard and there being no ocular disease, *is a safe employee*.

“Such employee should be required to carry at least one extra pair of glasses.

“Such employee should also be re-examined semi-annually to ascertain if there has been a further decrease in vision and if the glasses fully correct the visual defect.’

“Your answer to following questions will materially aid in establishing the consensus of opinion of the best authorities in the country upon the subject.

“I—Would you consider a railroad employee *a safe man*, as far as his vision is concerned, who has been in continuous

service for not less than five years and on re-examination his visual acuity was found below the required standard, there being no ocular disease, color vision meeting requirements, and his vision being raised to the required standard by the use of glasses?

“II—Should there be a minimum standard of diminution of vision for employees in this class?

“III—What would you consider the minimum amount of vision such an employe should possess to be promoted in service with glasses bringing his vision up to required standard?

“IV—How often, in your opinion, should men falling in the above class be re-examined to ascertain if there be a further loss of vision and determine if the glasses fully correct the defect?

“V—Approximately, what percentage of spectacles in your experience are broken by accidental or other means while on the wearer's face?

“VI—Can you consistently agree with the opinion given above?”

There are some answers from railroad surgeons and some from railroad officials. All the answers are appended to the paper. 463 affirmative answers were received, 22 negatives, and several with certain exceptions or provisions.

Following are some of the arguments brought to bear by those answering in the negative:

Dr. N. O. Nance states: “My opinion is formed entirely from my own experience in use of glasses for constant wear, and relate chiefly to ‘fogging’ of the lenses incident to exposure to a drizzling rain or the alternate effect of extreme cold and heat. I am satisfied that at times, under conditions just mentioned, my vision is less than  $\frac{10}{200}$ , which must be admitted by all is much too low for safety. Perhaps from a practical standpoint this opinion has no bearing whatever—I am not prepared to say; but since the receipt of your letter, one evening recently while out automobiling in a drizzling rain, I took occasion to imagine myself in an engine cab, looking ahead on the street with two Acetyline lanterns for a headlight. The result was very disappointing indeed, so much so that were I in a railroad train engineered by one with such defective vision as I possessed under the circumstances, I would most certainly have felt all but safe.”

This is true of automobiling where the driver is exposed to the climatic conditions continually, but an engineman is only exposed when he puts his head out of the cab window to determine a signal more plainly, his cab windows being blurred with rain and interfering with vision. The track ahead is not illuminated sufficiently with the oil headlights for him to observe any object in time to control his train for it, (the electric headlight illuminates sufficient distance to see a semaphore at  $\frac{1}{2}$  mile) so very little attention is paid to the track at night—he is watching for a signal light in the distance, which will inform him whether the block ahead of him is clear or occupied. Again, the weather conditions themselves are against distance vision, glasses or no glasses.

Dr. M. H. Post says: "From my knowledge of refraction and my own experience in driving, bicycling and running an automobile (I am almost 54) I am very positive in my opinion that I should answer 'yes' to your first question. I did not require glasses for any purpose until after I was 40, and I do all the above mentioned things with bifocal glasses." (Wears  $O^2 + 1.75 \text{C} + .50 \text{ 90}^\circ \text{ V} = \frac{20}{12}$ ).

Dr. L. A. W. Alleman replied "no" to question No. 1, but in a letter received later states: "The very first ride on an engine convinced me that you were quite right in your contention, and I question the safety of engineers who do not have a protecting glass."

Dr. F. G. Steuber answers: "While not desirable, ought to be continued in service," and cites a case of an engineer "whose vision without glasses is very low, with glasses about  $\frac{20}{30}$ , yet he has told me that he rarely uses the glasses and does not like to wear them. I enquired, 'How does it happen that you, having a fast run, have never had trouble?' 'Am exceedingly cautious, watch the time,' etc. Certainly this man is of more than ordinary intelligence, excellent judgment, sober in the fullest sense, has been my patient for years, yet the facts are as stated."

This brings up the question of the personal equation of the men, referred to by Dr. W. K. Rogers, i. e.: "The personal equation as I have mentioned under question No. 1 must count for a great deal. An engine driver of 15 or 20 years experience is usually a much safer man, with consider-

able error of refraction corrected by glasses giving from  $\frac{6}{10}$  to  $\frac{6}{6}$  vision, with all their disadvantages, than one of four or five years service. A man who is tried out and known to possess grit, discretion and presence of mind, cannot be readily classified, and while the surgeon adhering to the letter of the fixed standard would be obliged to report adversely upon the physical qualifications, his personal characteristics are too rare to allow this to be an arbitrary bar to his employment."

Dr. James A. Spaulding says, "Yes, except all lenses are liable to blur in frosty weather from changes of temperature. Opening the furnace or fire-box will occasionally throw out hot air which will condense on spectacles of engineers for a short time. If wearers are careful about this, as well as about leaving engine and going into the warm station rooms, I see no risk in their wearing spectacles for the hypermetropia or astigmatism of advancing years."

Dr. W. Harvey Smith writes: "Replying to your communication of the 16th inst., relating to the visual requirement of railroad employees: I do not agree with the opinion expressed in your paper appearing in the *Journal of the American Medical Association*, on the 18th of February last, for the following reasons:

"Persons wearing glasses who reside in the colder portions of the American continent, find when the temperature is low (in northwestern Canada for several weeks every winter the thermometer shows a range of from zero to 40 below) that upon going from the cold outer air into a warm atmosphere, an annoying condensation of moisture occurs on the lenses that are being worn, preventing the wearer from seeing for several minutes, or until the glasses have been cleaned. This would of course be more marked in the presence of steam, and as engineers and firemen are obliged sometimes to leave the cab of their engine to inspect or make repairs, or in order to see more clearly must sometimes open the cab window, it follows that glasses instead of being of value, would in this country in winter be positively dangerous.

"I believe it is the experience of most wearers of glasses, especially of persons who have marked deterioration of vision, that in semi-darkness or dusk, vision is better without than with correcting lenses. With this latter objection excepted,

I think that possibly the employees of southern railroads might not be regarded as dangerous if allowed to wear correcting lenses. But speaking for the western portion of the Canadian Pacific Railway, I consider the adoption of your views would in the Canadian Northwest, in winter especially, tend towards increasing the loss of life and property which results from visual disability on the part of employees, while general approval and adoption of your recommendations would in my opinion tend to undo much of the good that has already been done in educating railway officials to the necessity of protecting life and property by the adoption of a high visual standard."

The "fogging" from exposure to cold was spoken of earlier in this paper, and it should be remembered that the blurring referred to by Dr. Smith takes place after glasses have been exposed to the cold for a more or less long period of time, while the engineman only has his head out of the window for a few moments at a time and the "fogging" does not last as long; further, as the glass does not become as cold, the moment the lenses are exposed to the cold again the fogging disappears. It must be admitted that this feature is a strong one against glasses; however, the effect of the intense cold Dr. Smith speaks of on the unprotected eyes when running at a high rate of speed, is of great, if not a greater disturbance to vision and interferes as great a length of time as "fogged" glasses. Vision at dusk being better without correcting lenses, was referred to above.

Here are a few replies with exceptions or modifications:

Dr. J. W. Chamberlain: "In some cases yes, others no."

Dr. L. I. Dixon: "Fairly safe, except for unforeseen accidents depriving him of his glasses." Dr. F. B. Eaton:

"Generally yes, excepting when engineer or passenger is with only one fireman or engineman in cab." Dr. Clark W.

Hawley: "Only on branch lines; not on mail or fast trains."

Dr. W. K. Rogers: "Generally speaking, yes; but personal equation must be counted, and a minimum of such eyes should be reached by excluding latent hyperopes, etc." Dr.

G. W. Allyn: "Yes, if standard with glasses does not fall below  $\frac{20}{30}$ ." Dr. F. M. Chisolm: "When  $\frac{20}{30}$  in one eye

without glasses; otherwise not" (enginemen and firemen).



Dr. C. R. Holmes: "Yes, if his refractive error was of moderate degree." Dr. Lucian Howe: "Depends on the degree which the vision is below the required standard (should not be below  $\frac{6}{10}$  at least in one)." Dr. B. C. Kelly: "Yes, provided the uncorrected vision was not less than  $\frac{20}{30}$ ." Dr. Chas. W. Kollock: "Yes, if he did not require a stronger than + 2 for constant use." Dr. B. L. Millikin: "Yes, provided the required standard be normal vision." Dr. H. H. Seabrook: "Yes, unless uncorrected vision is below 0.4 ( $\frac{20}{50}$ )." Dr. Elmer G. Starr: "Yes, as provided in answer No. 3" ( $\frac{20}{40}$  in each eye tested separately). Dr. C. A. Veasey: "Not if his vision was less than  $\frac{20}{30}$ ." Dr. M. M. Cullum: "Yes, with certain limitations \* \* \* —a man's vision should be at once quick and accurate \* \* \* —for instance, two men may have a recorded vision of  $\frac{20}{20}$ , but one will pick out the letters quickly, accurately and confidently, while the other will get them slowly, laboriously and uncertainly." Dr. Hermann Knapp: "If a perfect field in either eye is required." Dr. Arnold Knapp: "Yes, except to the frequency of examination. Depends on case."

Questions No. 2 and No. 3 received the greatest variety of answers. Some replied, "No standard of diminution is necessary if glasses bring the vision up to the required standard." Other answers varied from  $\frac{10}{100}$  vision to  $\frac{20}{20}$ . Claude Worth (London) suggests regarding the minimum amount of vision without glasses: "He should, I think, be able in the event of glasses being lost, by the exercise of especial caution, to safely discharge his duties to the end of the run without them." Dr. T. C. Hood writes: "A railway engineer, patient of mine, age 47, is myopic, has without glasses R. V. =  $\frac{9}{200}$ , L. V. =  $\frac{20}{60}$ . With glasses R. V.  $\frac{20}{30}$ , L. V.  $\frac{20}{30}+$ . Service fifteen years. I consider him a safe man."

I gave an opinion, "Any one possessing  $\frac{20}{100}$  vision in one eye, the other having either better or worse vision, if, with glasses, the vision can be brought to normal in each eye, there being no ocular disease and color perception normal, is a safe engineer. It would be a rare case of a man with so low a grade of vision, without glasses, to have gotten into service in the first place; secondly, there would undoubtedly be more or less ocular disease present to account for such a diminution, which would exclude him."

Question No. 4, as to the frequency of examinations, the answers were from quarterly to once each three years. It was also suggested that "this should depend upon the cause and degree of the defect," the "age," "time of service," and "the surgeon who sees case should decide date of next examination."

Dr. W. H. Snyder suggested at the Annual Surgeons' Meeting of the Wabash road: "A re-examination of all our men before the fair at St. Louis. This was done and not an accident was caused by poor eyesight." Snyder also suggests re-examination "every year at no expense to the employee."

My idea is that up to the age of 35 men should be examined each three years and after any severe illness or accident, or any occurrence which seems to cast doubt on the visual capacity of the individual. Re-examinations should also be made more frequently of men known to be suffering from syphilis, albumenuria, diabetes or acute or chronic eye diseases. They should always be examined before promotion. After 35 they should be re-examined semi-annually to ascertain if there has been any further change in vision, or, if glasses are worn, if they correct the visual defect."

The following are some of the pertinent suggestions contained in the answers:

Dr. W. A. Snyder, Ophthalmic Surgeon, Detroit and Eastern Division Wabash R. R., states: "It is practically *impossible* to get a great number of enginemen who have perfect vision at the age they usually are when they get fast runs."

Dr. F. O. Marlowe writes: "In examining railroad men I have often felt that a grave injustice is done to them in accepting them with a static refraction of such kind that by the time middle age is reached the visual acuity *must* fall below the required standard, i. e., cases of a high degree of hypermetropia or hypermetropic astigmatism. Consequently it has seemed to me desirable to take into consideration not only what the vision is at the time of examination, but also what the static refraction is, and therefore what the vision *will* be when the man is between 40 and 50 years of age. Unless the use of glasses is unconditionally permitted, this seems to me a very important matter."

These are very important features and can not be eliminated with the present method of having candidates for employment examined by men who have not been scientifically trained for such work. Dr. Frank Allport "strikes the nail on the head" in the following: "I shall hope to see a day when all roads will unhesitatingly employ eye and ear surgeons who shall have charge of this department of the road and whose duties it shall be to see that all employees are properly examined." Until such a time, a certain proportion of old and trusted employees will have to wear glasses to continue their work, if a safe standard of vision is maintained.

Dr. Geo. de Schweinitz thinks "There is a good deal of value in Oliver's suggestion that a good many of these tests ought to be made at long ranges with suitable enlargement of the test object." Dr. J. R. Sturtevant suggests that "at least 00 eye with rims should be used, 000 better, and in presbyopes, the depressed bifocals should be designated as reducing confusion to a minimum. Dr. J. A. Ellwood calls attention to the "cases with normal vision in one eye and and sub-normal vision (even after correction of errors of refraction) in the other, occurring in old employees." A. Duane refers to monocular diplopia. Dr. C. R. Ellwood refers to the non-medical examiner "sometimes being a little bit hasty or arbitrary and that an injustice is done the applicant for the engine \* \* \* especially when the case is referred to the ophthalmologist of the road and he sustains the non-medical examiner's opinion on principle." Dr. A. I. Bouffleur, Dr. Jno. E. Owens, Dr. C. D. Wescott and Mr. A. E. Manchester do not believe a fireman should be promoted to the position of engineer, if glasses are required to bring vision up to the required standard.

Dr. A. I. Bouffleur says: "I do not believe a fireman should be promoted if glasses are required, unless the defect has resulted from his employment. As to engineers, I should think that a sliding standard would have to be made, depending upon age and years of service, as there are other things to be taken into consideration in reference to his qualifications than his eyesight," and gives his reason. "Most firemen come up for promotion on the Milwaukee road in four to eight years; they are also as a rule young men from 18 to 25 years of age. I hold that if in these young men sufficient change

in sight has occurred in the first few years of their employment so that it is necessary to utilize glasses to bring their vision above  $20/20$  and  $20/30$ , that the prospects of their becoming incapacitated at a comparatively early time in their life as an engineer is such that they should not be promoted, unless this defect has been brought about by their work. If a man is promoted at 30—which is late with a defective sight—what will the man be at 50 or 55? This point is of particular value when the question of pension comes into consideration; but my opinion is formulated wholly upon the proposition as to the safety of the employee. In other words, if a man's eyesight is normal at 20 and deteriorates 50 per cent. in six to eight years, except as the result of trauma, he would naturally become totally incapacitated before he reaches the age of 60. As an engineer has already passed through the experimental stage, and is older both as an employee and in years, the rapidity of change must necessarily have been much slower, and therefore the greater likelihood of his filling a full expectancy as an employee."

The conclusions reached are:

1st. That the protection afforded by glasses is a distinct advantage to enginemen and firemen.

2nd. That the disadvantages of glasses in railway service are not sufficient to render an employee unsafe who wears them for protection or to correct a latent refractive error made manifest by increasing age.

3rd. That wearing glasses for protection of the eyes in railway service will tend to prevent the reduction in vision usually found occurring in enginemen at 40 to 50 years of age.

4th. That the only method of eliminating glasses for distance in railway service in the future, is to have all applicants for employment examined for latent refractive errors when they apply for a position, by men scientifically trained for such work.

5th. That it is the consensus of opinion among the ophthalmologists of the United States that an engineman or fireman wearing glasses on duty is as safe an employee as one without them, if not safer.

<sup>1</sup>Young, Dr. H. B., *The Visual Requirements of Trainmen, Based on Personal Observations From an Engine Cab*, *Annals Ophthal.*, Jan. 1904.

<sup>2</sup>Lukens, Dr. Chas., *Rupture of the Eyeball*, *Annals Oph.*, July, 1900.

Name.	Question I.	Question II.	Question III.	Question IV.	Question V.	Question VI.
Allemann, L. A. W.	No	Yes	20/50	Yearly	1/10 of 1%	No
Barnes, J. Steele	No, generally; Yes, for Except'n'y yes exceptions		20/30-20/40 for exceptions	Quarterly	1 in 300	No
Bull, Chas. Stedman	No				3%	No
Bullard, Wm. L. Chisholm, F. M.	No When 20/30 in 1 eye without gl.; otherwise not	No		Not at all 6 mos.	Don't know Small	No
Coggin, D.	No, because of rain and snow on lenses obscuring V.					No
Denney, J. A. Chief Surg. C.B.& Q.R.R.	No	Yes	20/30 with both eyes open for engineers. 20/40 for train and yardmen	Yearly	Don't use them	Not with No. 1
Derby, Hasket	See Remarks					
Elmer, A. W.	Yes— See Remarks	Yes	20/40 in one and 20/80 in other	Yearly	Less than 1%	
Hall, W. D.	See Remarks					
Jeffries, B. Joy	Most certainly not	Yes	Only V=20/20 each eye. No gl. allowed or needed	No gl. should be needed	Not many brok- en. All too dirty not	Most certainly not
Kipp, Chas. J. Magee, R. S. Oculist and Aurist for A.T.&S.F. R.R.	No No	Yes Yes	6/6 without gl. No	3 years 6 mos. to 1 yr.		No No
Nance, Willis O.	See Remarks			6 months	1/10 of 1%	
Oliver, Chas. A.	No, there must be normal vision (uncorrected) for distance in each eye				5 to 10%	
Phillips, Wm. H.	I question his being safe				Cannot say	
Rogers, F. T.	No				1/10%	No
Smith, W. Harvey	See Remarks					



Question VI.

## Remarks.

Letter March 7, '05.

The chief danger, I take it, from a man dependent upon a glass for necessary vision is the clouding due to steam or change of temperature. The danger from broken glasses is very slight; but should it happen, it would be most likely to be at a time when changing glasses would involve a serious loss of time. (The following is extract of letter dated May 25th, '05, after having ridden in an engine cab.) My very first ride in an engine convinced me that you were quite right in your contention, and I question the safety of engineers who do not have a protecting glass.

Questions II, III and IV I have not answered because I have answered No. I in the negative. I assume that the term "railroad employe" refers to engineers, firemen, brakemen, switchtenders and conductors or in other words all out door employes engaged in the switching, dispatching, and management of trains and does not include indoor employes.

In general, no; it depends upon the amount of vision without glasses.

In this vicinity I believe new men who are H. cannot be appointed as engineers, although old engineers are allowed to wear glasses. After a few years it is likely glasses will not be seen in the cabs.

ith No. 1

Does not consider a railroad or steamboat employe whose vision requires to be brought up to a useful amount by the use of glasses a suitable person to be entrusted with the lives of the community. In a great emergency, where instant action is necessary, the glasses might become clouded, broken, or lost. It is true that the chance of this occurring is comparatively small, but still a distinct risk is involved. Normal vision with the unaided eye he would therefore consider both desirable and necessary.

The answers apply to all others than enginemen—I don't think any man on the engine should wear glasses and that should be decided when he applies for the position as fireman. If applicant has more than 1 D. H. he should be rejected.

I believe that no man should be allowed to control an engine (R. R.) whose distant V. is below 5/5 Sn. and would eliminate hyperopes if V. falls below, even though improved by + gl. Would like to exclude the presbyope (steam gauge, etc.). Have of course no practical experience in running a locomotive, but feel, selfishly no doubt, that with one life to enjoy, the least the traveler may demand from the R. R. management is absolute visual acuteness and sobriety in the engineer, and the same as regards the fireman if he is later to assume the duties and responsibilities of the engineer. The percentage of glasses broken, is, I should say, small, when on the patients' face.

I still must insist on 20/20 V. for engineers and firemen on entrance to R. R. duty, then we should not have reduced V. from H. subsequently.

Do not permit the wearing of gl. for engineers or firemen only for reading their orders.

I do not consider a R. R. employe (an engineman) a safe employe when wearing glasses. My opinion is formed entirely from my own experience in the use of glasses for constant wear and relates chiefly to the fogging of the lenses incident to exposure to a drizzling rain or the alternate effect of extreme cold and heat. I am satisfied that at times, under the conditions just mentioned, my V. is less than 10/200, which it must be admitted by all is much too low for safety. Perhaps from a practical standpoint this opinion has no bearing whatever; I am not prepared to say, but since receipt of your letter, one evening recently while out automobiling in a drizzling rain, I took occasion to imagine myself in an engine cab looking ahead on the street with two acetylene lanterns for a headlight, the result was very disappointing indeed, so much so that were I in a railroad train engineered by one with such defective V. as I possessed under the circumstances, I would most certainly have felt all but safe. If employes must wear glasses their eyes should be re-examined at least every 6 mos.

(Dr. Oliver in conversation with the writer said the man was an efficient employe, but not safe).

Nothing but practical tests would ever make me believe that an engineer wearing glasses is a safe driver in all kinds of weather. Personally I wear a high cylinder, and in rainy, misty weather, I never feel safe for a moment driving my automobile, as I cannot see, although under favorable conditions I have 20/15 V. I believe that safety demands that all sentiment be laid aside and that the requirements of V. in an engineer be up to the limit. If there be any question after a fair test, err on the safe side. 20/20 without glasses and not more than 1 D. latent hypermetropia, or .25 astigmatism, is not too rigid.

My personal experience in rainy and foggy weather, when I can neither see with my glasses or without them, and the difficulties I have had in automobiling, lead me to deem the necessity of gl. an element of danger. I know of no reason why an engineer should not have the same difficulty. I appreciate what you say regarding heat and cold, but I agree with you in that if that were the only objection to wearing the glasses, it would be quite safe.

Persons wearing glasses who reside in the colder portions of the American Continent find, when the temperature is low, (in Northwestern Canada for several weeks every winter the thermometer shows a range of from zero to 40° below), that upon going from a cold outer air into a warm atmosphere an annoying condensation of moisture occurs on the lenses that are being worn, preventing the wearer from seeing for several minutes, or until the glasses have been cleaned. This would of course be more marked in the presence of steam, and as engineers and firemen are obliged sometimes to leave the cab of their engine to inspect or make repairs, or in order to see more clearly must sometimes open the cab window, it follows that glasses instead of being of value would in this country in winter be positively dangerous.

Name.	Question I.	Question II.	Question III.	Question IV.	Question V.	Question VI.
Sterling, J. W.	No, the blurring of lenses from steam, oil, and cold air in winter is the great drawback for engineers, etc.					
Van Slyke, F. W.	No	No	Normal with-out gl.	Never	Train personal unknown	No
Van Nolte, Wm. B.	No				5%	
Woodward, J. H.	No					No
Abaly, W. C.	Yes	Yes	20/30	Once or twice a year	About 1/2%	Yes
Abbe, Alanson J.	Yes	No		Every 2 yrs. bet. age 35 & 40. Ev. yr. 40 to 47; Ev. 5 yrs. 47 to 60	Very small; less than 1%	Yes
Adams, A. L.	Yes	Yes	6/9 both eyes	Annually	2%	Yes
Adams, A. E.	Yes	Yes	20/50	Yearly	A very small fraction	Yes
Adams, C. F.	Yes	Yes	6/9	12 mos.	1 in 12 mos.	Yes
Albro, M. Z.	Yes	See Remarks	See Remarks	6 mos.	No idea—very small	Yes
Alcorn, D. N.	Yes	No—See Remarks		Annually or semi-annually	Very small, have never known but 3 or 4 such	Yes
Alkire, H. L.	Yes	Yes	15/30	Every 6 mos.	Very small	Yes
Alleman, L. A. W.	Yes	?	20/200	Once a year	1/2 of 1%	Yes
(See negative replies)						
Allen, Geo. F.	Yes	Certainly	20/50	4 to 6 mos.	1/10 of 1%	Yes
Alling, Arthur N.	Yes			About once a yr.	Comparatively very few	Yes
Allport, Frank	Yes	20/20 & 20/30	Yes	Every 3 yrs.	Hardly any	Yes
Allyn, C. W.	Yes, if standard with glasses does not fall below 20/30	Yes	First-class men Not less than 20/30 with gl.	When a defect is discovered he should be examined every 2 mo. until cause has been discovered	With metal workers quite frequently. Had gl. 3 days ago	Yes
Alt, Adolf	Yes	I do not see why if V. can be brought up to 20/20 with gl.		Once a year	A very small percentage	Yes
Alter, Francis W.	Yes	Yes	20/30	Every 2 yrs.	1/10 of 1%	Yes
Andrews, Albert H.	Not sufficiently unsafe to justify dismissal	No		At least yearly	Very small	Yes if above 45
Andrews, Jos. A.	See Remarks					
Anten, Frank E.	Yes	No		Annually	Have no record	Yes
Archibald, O. W.	Yes	Yes	20/30	Every 3 to 6 mos. Circumstances the guide	Don't know	Yes
Ard, F. C.	Yes	Yes	20/50 monocular vision	6 mos.		Yes
Babcock, W. D.	Yes	Yes	20/30	Yearly	2%	Yes
Bach, Jas. A.	Yes	Yes	20/40	Annually	5%	Yes
Bachenstoe, M. J.	Yes	Yes		Half yearly	2%	Yes
Bailey, Wm. J.	Yes	Yes	6/6 one eye, 6/12 other	Every 6 mos.	1/2 of 1%	Yes
Baker, A. R.	Yes	Yes	20/70	6 mos.	Less than 1%	Yes
Baker, Chas. H.	Yes	Yes	20/40 binocular	At least yearly	Less than 1% when lenses are in rims	Yes
Baker, H. B.	Yes	Yes	5/10	Yearly	1/2% ?	Yes, if these men are healthy

Question VI.

## Remarks.

I believe it is the experience of most wearers of glasses, especially of persons who have not marked deterioration of V. that in semi-darkness or at dusk, V. is better without than with correcting lenses. With this latter objection, excepted, I think that possibly the employees of Southern railroads might not be regarded as dangerous if allowed to wear correcting lenses, but speaking for the Western portion of the Canadian Pacific R. R., I consider the adoption of your views would in the Canadian northwest, in winter especially, tend toward increasing the loss of life and property, which results from visual disability on the part of employees while general approval and adoption of your recommendations would, in my opinion, tend to undo much of the good that has already been done in educating railway officials to the necessity of protecting life and property by the adoption of a high visual standard.

Greatest safety, rather than "greater safety" is needed, especially in the United States.

An engineman should not wear gl. because of rain and snow fogging them.

Normal vision without glasses and re-examination every year after the fortieth year for engineers and firemen and a minimum requirement for them of 6/6, and normal color perception.

If glasses are permitted and do bring vision up to standard, diminution may be of little consequence.  
(III) No minimum of V. can be fixed upon if gl. are permitted and bring V. up to standard  
(II & III) If he has been a safe man for 5 yrs. and eyes sound, it is hard to see how he could fall below safe from purely refractive defects.

above 45

I quite agree with you in the opinion which you have expressed in regard to safety of employing an engineman whose vision can be brought up to required standard with gl., providing his color perception meets the required standard.

I believe an engineer of 5 yrs. experience who has traveled over the road many hundreds of times, who has a vision of 20/50 in each eye without a correction of his refractive error, and with a correction has a vision of 20/20, this same engineer with a pair of glasses on his nose and another pair in his pocket, is a fairly safe proposition. He is so familiar with the objects about him, as a result of long experience, that even without his glasses he is able to see sufficiently well to avoid danger. I have frequently heard the statement from patients whose vision, without glasses is about 20/50 and with glasses is 20/20, that as they look out of the window down the street for a considerable distance, the difference in vision with and without glasses is not so well marked as one might expect.

From close personal observation I believe any person having V. much less than 20/40 of one eye, even if corrected by lenses, has too sluggish perceptions (visual) to be a safe person for railway service.

these  
e healthy

Name.	Question I.	Question II.	Question III.	Question IV.	Question V.	Question VI.
Ball, M. V.	Yes	Yes	6/12 (useful without gl.)	Once a year.	1/10%, mainly in children	Yes
Bane, W. M. C.	Yes	Should be same as without gl.	Same as without gl.	6 mos. to 1 yr.	No data	Yes
Barek, C.	Yes	Yes	6/26	Once to twice yr.	Cannot tell	Yes
Barnstein, Edw. J.	Yes	Yes	20/40	Yearly	Exceed'ly small	Yes
Bartholomew, A. C.	Yes	No		Semi-annually	1%	Yes
Beaudoux, H. G.	Yes	Yes	20/40 for hyperope; 20/70 for myope	Annually for H. Semi-annually for M.	Very small	Yes
Beetham, A. C.	Yes	Yes	15/50	6 mos.	2%	Yes
Bell, E. S.	Yes	Yes	20/40	Yearly	1/2 of 1%?	Yes
Belt, E. Oliver	Yes	Yes	20/30	Annually		Yes
Bennett, Arthur G.	Yes	Yes with discretion given to examining phys'cn	See Remarks	Annually	Rimmed exceedingly few	Yes
Bentley, H. T.	Yes	Yes		At least yearly		Yes
Berens, Bernard	Yes	Yes	20/200	Yearly	Less than 1%	Yes
Bishop, C. Wesley	Yes	Yes	20/100	6 mos. until no change	Almost nil	Yes
Blaauw, Edmond E.	Yes					
Black, Melville	Yes	Yes	20/20	Yearly	5%	Yes
Blake, Francis W.	Yes	Yes	15/20	6 to 18 mos. depending on age	Very rare	Yes
Bondurant, A. A.	Yes	Yes	20/40	Yearly	1/10 of 1%	Yes
Boyd, E. T.	Yes	Yes	20/30-20/50	6 mos.	Small	Yes
Bouffleur, Albert I, Chief Surg. C. M. & St. P. R. R.	See Remarks	See Remarks	See Remarks	See Remarks	See Remarks	See Remarks
Braddfield, Jas.	Yes	Yes	20/60; after 55 20/120	1 to 3 yrs.	1/10 of 1%	Very nearly
Bradford, H. W.	Yes	Yes	6/10	6 mos.	Rarely	Yes
Braun, Otto	Yes	Yes	20/40	Every 3 mos.	7/10% or less	Yes
Brawley, Frank E.	Yes	Yes	20/50	6 mos.	With rims, practically never	Yes
Breckenridge, H. E.	Yes	Yes	20/75	6 mos.	Very small	Yes
Brinckerhoff, G. E.	Yes	Yes	20/40	Yearly	2%	Yes
Briggs, H. H.	Yes	Yes	20/200 in better eye	Every 6 mos. until constant V. is found; then yearly	2%	Yes
Briggs, Wm. E.	Yes	Yes	6/12	Yearly	Very small	Yes
Brobst, C. H.	Yes	Yes	20/50	Semi-annually or after serious illness.	3% or less	Yes

Question VI.

## Remarks.

I should say something depended on the nature of the error. High grades of astig. might be unsafe even if fully corrected, because of distortion of objects.

The only drawback I can see to a railroad engine driver wearing glasses might be the accumulation of dirt or moisture, or both, on the glasses.

I consider a man with gl., provided his error of ref. is not over 1 D., either H. or M., better fitted to meet all requirements on a running train than the man without, unless he wears shields of the very best glass made

This depends on the kind of refractive error present, myopia requiring a different standard from hyperopia.

A 2 yrs. re-examination will be sufficient except the man being excessive with smoking and drinking. If they are carefully supervised in this regard, much trouble will be avoided. His urine needs the same examination for albumin as the standing position seems to have a malign influence.

Remarks

Q. 1. Yes, but if he is a fireman I do not think it would be wise to promote him if his vision fell below 20/20, and 20/30 within 5 yrs. If such changes occur in so young a man within so short a time, it will not take long for him to become an unsafe employe.

Q. 2. Yes, but instead of classing the two employments in one, they should be classed in two.

Q. 3. I do not believe a fireman should be promoted if glasses are required, unless the defect has resulted from his employment. As to engineers, I should think that a sliding standard would have to be made depending upon age and years of service, as there are other things to be taken into consideration in reference to a man's qualifications than his eye sight.

Q. 4. Re-examination should depend upon the cause and degree of the defect. Ordinarily once in two years is sufficient, but in special cases, particularly if it is dependent upon constitutional conditions, frequent general examinations, as well as those of the eye, should be made.

Q. 5. I have had no experience of this phase of the subject.

Q. 6. I should answer yes, with the restrictions given in 1 and 4.

Referring to the position which I took in regard to firemen, I will state in addition to what I previously have done, that the age of service has considerable to do with the matter. Most firemen come up for promotion on the Milwaukee Road in 4 to 8 yrs.; they are also as a rule young men from 18 to 25 yrs. of age. I hold that if in these young men a sufficient change in the sight has occurred in the first few years of their employment so that it is necessary to utilize glasses to bring their vision above 20/20 and 20/30 that the prospects of their becoming incapacitated at a comparatively early time in their life as an engineer is such that they should not be promoted, unless this defect has been brought about by their work. If a man is promoted at 30, which is late with a defective sight, what will that man be at 50 or 55? This point is of particular value when the question of pension comes into consideration, but my opinion is formulated wholly upon the proposition as to the safety of the employe. In other words, if a man's eyesight is normal at 20 and deteriorates 50% in 6 to 8 yrs., except as the result of trauma, he would naturally become totally incapacitated before he reaches the age of 60. As an engineer has already passed through the experimental stage and is older both as an employe and in years, the rapidity of change must necessarily have been much slower, and, therefore, the greater likelihood of his filling a full expectancy as an employe.

nearly

In answering the 1st question, I would say that in case in which V. did not fall below 6/12 without gl. and could be brought up to 6/6 with gl. in each eye, that such a man would be safe visually for service as an engineer or other train duty. I find that many men who come up to the visual requirements of the S. P. Co. have errors of refraction which need correction very much, and the men would often be much better qualified to do work if the rules allowed them to wear the proper correction of their refractive defects. The engineers here are suffering very greatly since the introduction of the oil burners, from getting sand in the eyes. I think these men would be safer if they habitually wore protecting glasses, even if they did not need the glasses, for correction of defects.



Name.	Question I.	Question II.	Question III.	Question IV.	Question V.	Question VI.
Brose, L. D.	Yes	Yes	20/30	Yearly	Skeleton lenses Yes very often, and should not be worn. Other lenses but fraction of 1%.	Yes
Brown, Ewd. J.	Yes	?	?	6 months until shown to be stationary	Very small	Yes
Brown, Earl J.	Yes	Yes	?	6 mos.	Very few	Yes, fully
Brown, John E.	Yes	Yes	See Remarks	Annually	Very few	Yes
Brown, Sam'l H.	Yes	Yes	6/9	Annually	About 5%	Yes
Bonner, Horace	Yes	Yes	?	At least once a yr., better twice	Very, very small	Yes
Bruner, Wm. E.	Yes	Yes	Probably 6/18, though possibly 6/24	Yearly at least	Very rarely	Yes
Bruns, H. Dickson	Yes	Yes	Not less than 20/30	Yearly	Very few	By all means
Bryant, D. C.	Yes	Yes	75/100	Yearly	Not 1%	Yes
Buckman, Ernest U.	Yes	No		Yearly	Practically none	Yes
Buckner, Jas. H.	Yes	Yes	40/100	6 mos.	1/10 of 1%	Yes
Buckwalter, J. C.	Yes	Yes	20/20	6 mos.	1/4%	Yes
Bullard, T. E.	Yes	Yes	20/50	6 mos.	1/5 of 1%	Yes
Bulson, A. E.	Yes, if gl. give V. 20/20	Yes	Not less than 20/30	Yearly	Very small	Yes
Burnett, Swan M.	Yes	Yes	See Remarks	6 mos.	Very few	Yes
Burrows, Jr. Lorenzo	Yes	Yes	20/50	6 mos.	Not 1 in 1000 if with rims	Yes
Butler, W. K.	Yes	Yes	6/12	6 mos. for M., yearly for H.	1 in 1000	Yes
Cadwell, C. T.	Yes	Yes	20/70	9 mos.	1/10 of 1%	Yes
Calhoun, A. W.	Yes	If gl. make V. normal, I would consider him a safe man	Same as No. II	Once or twice a year	2 or 3%	Yes
Callan, Peter A.	Yes	Yes	2/3	2 yrs.	Almost nil	Yes
Cambert, W. E.	Yes	Yes	20/50	Yearly	Very small	Yes
Cannady, A. A.	Yes	Yes	20/30	Yearly	About 5%	Yes
Connor, Leartus	Yes	No	20/100	6 mos.	2 in 10,000	Yes
Capron, F. P.	Yes	Yes	20/40 or even less, according to individual	6 to 10 mos.	Very small	Yes
Carver, W. F.	Yes	Yes	20/40	2 yrs.	1/5 of 1%	Yes
Carmolt, W. H.	Yes—How much below?	Yes	Would not promote such a man	Depends upon character of error and age		Practically yes
Carpenter, John T.	Yes	Yes	6/6	Yearly	Almost never	Yes
Carrier, Frederic	Yes	Yes	75%	Yearly		Yes
Carrow, Fleming	Yes	No		8 mos. to yr.	Very small	Yes
Carvelle, H. B. W.	Yes	Yes	20/30	Once or twice a year	10 in 17,000	Yes
Chambers, T. R.	Yes	Yes		Yearly	Entirely a personal equation	Yes
Chamberlain, J. W.	In some cases yes, others no	Yes	20/30	6 mos.	Very small	Yes
Chance, Burton	Yes	Not below 5/20	5/20	6 mos.	Seldom	Yes
Chandler, Henry B.	Yes	Yes	4/10	6 mos.	Very few	Yes
Chase, John	Yes	Yes	If gl. give 20/20, does not matter	Yearly	Not 1 in 500	Most heartily
Chattin, J. Franklin	Yes	Yes	20/100	Yearly	1/10 of 1%	Yes
Cheatham, Wm.	Yes	No		Yearly	Very rare	Yes
Cheney, Fredk. E.	Yes	Yes	?	Yearly	Very small in rims	Yes
Church, B. F.	Yes	No, provided V. can be brought up by gl.		6 mos.	1% or less	Yes
Churchman, V. T.	Yes	Yes	20/80	Yearly	1 to 3%	Yes
Claiborne, J. H.	Yes			6 mos.	Once	Yes
Clap, E. W.	Yes	Yes	20/70	6 mos.	1/10 of 1%	Yes
Clark, C. F.	Yes	Yes	5/9	6 to 12 mos.	1/10 of 1%	Yes
Clark, E. E.	Yes	Yes	20/30	6 mos.	1/4%	Yes
Clement, G. C.	Yes	Yes	20/80	6 mos.	1%	Yes
Cogan, J. E.	Yes	Yes	6/9	Yearly	?	Yes
Colburn, J. E.	Yes	Yes	3/5	Yearly	1/4%	Yes
Coleman, J. A.	Yes	Yes	20/100	6 mos.	Very few	Yes
Coleman, W. F.	Yes	Yes	2/3	6 mos.	5%	Yes
Conkey, C. D.	Yes	Yes	60/40	Yearly	1/10%	Yes

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Remarks.

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It seems to me that some elasticity should be given in reply to this; with V. of better eye approximating 20/30.

I think that the minimum visual acuteness to be allowed an employe, without glasses, should not be lower than 5/20 or 5/30, even if proper glasses bring V. up to normal.

If the standard of V. be 20/20 in each eye, and this obtained by correcting glasses.

I think when very strong concave gl. are required, which reduce the size of the image or the field very much, would be harmful. One objection to gl. with such employes is condensation on a cold lens and not keeping gl. clean. Soap on the lenses, such as we use on our laryngeal mirrors, will partly correct the first. Of course keeping the lenses warm will do it also, but this cannot always be done.

Name.	Question I.	Question II.	Question III.	Question IV.	Question V.	Question VI.
Coover, D. H.	Yes	Yes	2/12+	3 mos.	Mighty few	Yes
Corsen, J. B.	Yes	Yes	6/12	2 yrs.	See remarks	Yes
Corson, J. O. (Examiner for L. & N. R. R.)	Yes	Yes	Not prepared to say, but in very high degrees only	6 mos. for a yr. or so; if no change not so often.	Very small	
Coulter, Chas. F.	Yes	Yes	6/12	6 mos. or less	Less than 8%	Yes
Conitas, R. J.	Yes	Gl. should make V. normal	See Remarks	6 mos.	Less than 1%	Yes
Cox, R. T.	Yes	Practically no		6 mos.	Very small	Yes
Craige, W. G.	Yes	Yes	20/50	Depends on age and ref. cond.	1/4%	Yes
Crane, C. A.	Yes	Yes	20/40	6 mos.	Not 1%	Yes
Crocker, F. S.	Yes	Yes	20/40 both eyes	Yearly	Not large	Yes
Croskey, John W.	Yes	Yes	20/40	See Remarks	1%	Yes
Culbertson, L. R.	Yes	Yes	5/6 one; 5/6 other	2 yrs.	10%	Yes
Cullom, M. M.	Yes	Yes	20/50	Once or twice a yr. according to kind of error	Not over 1%	Yes, with certain limitations
Culver, C. M.	Yes	Yes	40%	6 mos.	1/10 of 1%	Emphatically
Cunningham, H. M.	Yes	Yes	6/12	6 mos.	None (rimmed)	Yes
Curdy, R. J.	Yes	Yes	20/60	6 mos.	Less than 1%	Yes
Dabney, S. G.	Yes	Yes	20/20	2 yrs.	Very small	Yes
Daviss, E. P.	Yes	20/40	20/40	Yearly	Less than 1%	Yes
Davidson, John P.	Yes	No	Not if lenses bring V. to normal	1 to 2 yrs.	1 in 300	Yes
Davis, E. W.	Yes	Yes		6 mos.	Very small	Yes
Davis, A. E.	Yes	Yes	20/40	6 mos.	2%?	Yes
Dean, F. W.	Yes			Yearly	Small	Yes
Dean, G. E.	Yes	Yes	?	Yearly	Very small	Yes, fully
Dean, H. J.	Yes	Yes	20/200	1-1 1/2 yrs.	Very few	Yes
Dennis, David N.	Yes	Yes	4/15	Yearly	1 in 1000	Yes
Dial, E. A.	Yes	No	If no amblyopia & gl. give re- quired standard	Yearly	2%, adults	Yes
Dickinson, Francis	Yes	Yes		Depends on age and how well fitted 1st time	Very few	Yes
Dickey, John L.	Yes	Yes	20/40	Yearly	1 in 1000	Yes
Dietrich, W. A.	Yes	Yes		3 to 6 mos.	Practically none	Yes
Dixon, L. I.	Fairly safe	Yes	1/2	6 mos.	1 in 5000	Yes
Dodd, Oscar	Yes	Yes	20/50	6 mos.	Very few	Yes
Donovan, John A.	Yes	Yes	20/50?	Yearly	Less than 1%	Yes
Dorsey, J. G.	Yes	No		Yearly	1%	Yes
Dowling, Oscar	Yes	Yes	20/50	4 mos.	1 in 1000	Yes
Drew, C.	Safe, but better without gl.	Yes	OD 20/20, OS 20/40	6 mos.		Yes
Duane, Alexander	Yes	Yes	20/40	6 mos.	Very rarely	Yes
Dudley, W. H.	Yes	Yes	20/30	Yearly	1 in 500	Yes
Dufour, C. R.	Yes	Yes	20/40	6 mos.	Very small	Yes
Dunn, Ira J.	Yes	Yes	6/9	6 mos. for few times; if no change, yearly	2%	Yes
Dunn, Jas. W.	Yes	Yes	15/30 both eyes	Yearly in pres- byopes	5/10%	Yes
Easton, Elwood T.	Yes	Yes	20/40	6 mos.	O+ with rims	Yes
Eaton, F. B.	Generally yes	Yes	2/3	Yearly	1/10 of 1%	See Remarks
Edwards, J. A. Oculist and Aurist to L. & N. R. R. Co.	Yes	Yes	20/40	6 mos.	Cannot tell	Yes
Ellegood, J. A.	Yes	Yes	6/12	2nd exam. 3 mos. 3rd in 6 mos. afterwards yrlly.	1/10% 1/10%	Yes
Ellett, C. E.	Yes	No		Yearly		Yes
Ellis, H. Bert	Yes	No		6 mos.		Yes

Question VI.

## Remarks.

I have yet to see a pair of rimmed specs that have been broken while on the wearer's face. It is my opinion, and we put your first section in practice on the L. & N. R. R. At present the road does not specify as to re-examination, but should do so.

Firemen requiring glasses should not be promoted to enginemen.

Depending entirely upon a man's habits; a man who used alcohol and tobacco should be examined monthly; a strictly temperance man, six months. The additional experience and caution acquired with advancing years would more than compensate for the loss in V., provided it could be brought to normal.

This is an exceedingly grave question and one which merits our most thoughtful consideration. The frequent and terrible railroad accidents which afflict this country are a cause for national sorrow and shame. It is imperative that every restriction should be thrown around men upon whom such weighty responsibility rests. When we reflect that a train travelling at the rate of 60 miles an hour covers almost 90 ft. in one second of time, we can appreciate why a man's vision should be at once quick and accurate. There are so many factors that cannot be encompassed by rules that a great deal should be left to the intelligent judgment of the examiner; for instance: two men may have a recorded vision of 20/20, but one will pick out the letters quickly, accurately and confidently, while the other will get them slowly, laboriously, and uncertainly. The reason I suggest 20/50 as the minimum vision an employee should possess is that I do not think an employee should be retained in a highly responsible position whose vision is so poor that he is absolutely helpless without his glasses. It is a matter of great importance to the country that a scientific standard should be worked out whereby the vision of railroad employees may be fairly judged.

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The tests should be practical tests on work, not in office; past record should be taken into a/c.

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Would suggest the engineer or employee be required to use glasses with rims, and if he have second pair available I see no necessity for a minimum standard.

I should say 20/40, or in case of exceptionally good and reliable employees, 20/50. This would depend somewhat on condition causing poor sight, for example: Astigmatism causing poor sight may cause monocular diplopia, particularly when looking at a small light, such as would represent a railroad signal. Such diplopia might occasion more confusion and risk of disaster than would the blurring due to a simple myopia.

Remarks

About 20/40 in presbyopes. Aged 30 to 35 about 20/30; under 30 about 20/20. Yes, excepting when engineer of passenger is with only one fireman or engineman in cab. (Late oculist to U. P. R. R. & Ore. and Nav. Co.)

I hope you will pardon me for calling to your attention cases of normal vision in one eye and subnormal vision (even after correction of errors of refraction) in the other occurring in old employees.

Name.	Question I.	Question II.	Question III.	Question IV.	Question V.	Question VI.
Elwood, Calvin R.	Yes	Yes	20/40	Yearly	26%	I can
Engle, H. P.	Yes	Yes	20/80	6 mos.	.001%	Yes
Erwin, A. J.	Yes	Yes	10/20	Yearly	1%	Yes
Evans, C. L.	Yes	Yes	20/40	6 mos.	5%	Yes
Ewing, U. B. G.	Yes	Yes	Difficult to fix upon	6 mos.	2 or 3%	Yes
Faith, Thos.	Yes	Yes	20/80	Yearly	1%	Yes
Ferris, E. S.	Yes	Yes	6/9	6 to 12 mos.	5%	Yes
Fish, H. M.	Yes		20/100	Yearly		See Remarks
Fisher, Herschel	Yes	No ?	10/20?	6 mos.	2%	Yes
Fisher, W. A.	Yes			3 mos.	Hardly any	Yes
Fitch, W. H.	Yes		20/40	6 mos.	1%	Yes
Fletcher, E. L.	Yes	6/6	Normal 6/6	6 mos.	1/10 of 1%	Yes
Franchere, F. E.	Yes	Yes	6/9	Yearly	1/10%	Yes
Frankhauser, F. W.	Yes	Yes	20/40	2 years	1%	Yes
Friebis, Geo.	Yes	Yes	Your standard	6 mos.	Cannot say	I can and do
Friedmann, Arthur C. H.	Yes	Yes	5/20 - 5/25	Yearly	Less than 1%	Yes
Fridenberg, Percy	Yes	Yes	20/70	6 mos.	0.1%	Yes
Fringer, W. R.	Yes	Yes ?	20/70 ?	6 mos.	1/5 of 1%	Yes
Gamble, W. E.	Yes	Yes	20/40	Yearly	Fraction of 1%	Yes
Gardiner, E. J.		Yes	20/50	Quarterly	1/2 of 1%	I do
Garten, M. H.	Yes	Yes	25%	6 mos.	1% or less	Yes
Getz, H. L.	Depends on duties	Yes	20/40	Yearly	Don't know	Yes
Gibbons, Edw. E.	Yes	Yes	20/30	6 to 12 mos.	Very few	Yes
Gifford, H.	Yes	Yes	20/30 both eyes together	2 yrs.	A negligible quantity	Yes
Gillette, P. F.	Yes	Yes	6/12	6 mos.		Yes
Gillman, R. H. W.	Yes	Yes	20/60	Yearly	1/2%	Yes
Goldsmith, Perry G.	Yes	Yes	6/18	Yearly	2% ?	Yes
Goldberg, Harold G.	Yes	Yes	6/8 one eye, other 6/15	Yearly	5% ?	Yes
Gorham, Geo. H.	Yes	Yes	20/50	6 to 12 mos.	1%	Yes
Gould, Geo. W.	Yes	No		2 yrs.	Extremely small	Yes
Gradle, H.	Yes	Yes	20/50 both eyes	2 yrs.	Very small	Yes
Grant, Harry Y.	Yes			6 mos.		Yes
Grant, J. G.	Yes	Yes	20/30	Yearly	5%	Yes
Greene, D. W.	Yes	Yes	1/2		2% ?	Yes
Greenwood, Allen	Yes	No	Would depend entirely on cause of failing V.	Yearly	Very small	Yes
Griffin, O. V.	Yes	Yes	20/40	Yearly if tested under cycloplegic	5% ?	Yes
Griffith, M.	Yes			6 mos.	1% ?	Yes
Grove, Benj. H.	Yes	Yes	20/60	Yearly	1/2 of 1%	Yes
Grove, W. F.	Yes	Yes	20/40	6 mos.	2 to 5%	Yes
Guilford, Paul	Yes	Yes	20/30 & 20/40	6 mos.	Rare	Yes
Guttman, J.	Yes	Yes	20/30	6 mos.		Yes
Hager, W. A.	Yes	Yes	6/9	Yearly	Very small	Yes
Hagler, Elmer E.	Yes	Yes		Yearly up to 50, then ev. 2 yrs.		Yes
Hagler, Arthur L.	Yes	Yes	20/20	Annually	2%	Yes
Harlan, Herbert	Yes	Yes	20/40	Yearly	Very few	Yes
Hale, Albert B.	Yes	Yes	6/9	6 mos.	Very seldom	Yes
Hale, Geo. W.	Yes	Yes		Yearly	None	Yes
Hanna, Hugh	Yes	Yes	20/30	6 mos.	2%	Yes
Hansell, Howard F.	Yes	No	No minimum	Yearly	Insignificant	Yes
Hanske, E. A.	Yes	Yes	20/40	6 mos.	None during 5 years	Yes
Harlan, Geo. C.	Yes	Yes	2/3	6 mos.	Rather rare	Yes
Harrison, W. G.	Has had no experience					
Hatch, W. G.	Yes	Yes	20/50	6 mos.	1%	Yes
Heath, F. C.	Yes	Yes	20/40	6 mos.	1/10 of 1%	Yes
Heckel, Edward B.	Yes, if error of ref. is not too great	Yes	Greatest ref. error should not be over 3 or 4 D.	6 mos.	.01%	Yes
Henderson, F. L.	Yes	No	See Remarks	Yearly	No record	Yes



Question VI.

## Remarks.

I would suggest that sometimes the medical examiner is a little bit hasty or arbitrary and that an injustice is done the applicant for the engine. I do not care how rigid the examination is for the fireman, but if he has served a satisfactory apprenticeship and his time comes for promotion, it seems a gross injustice, which sometimes blights a young man's prospects, to be rejected when his eyes are in the same condition they were when he made his first application.

One of my patrons who has been a passenger engineer for at least 15 yrs. on the Penna. Lines (been with them as an engineer for over 19 yrs.) and has an unusually good record for small number of accidents, has a visual acuity of O. D. 15/120+O. S. 15/160+, corrected with O. D. + 3.50 combined +3.00, 95°, O. S. +4.00 comb. +1.50 75°, V.=15/20 and 15/15.

Remarks

Yes, with possible exception of so frequent re-examination in certain cases.

It seems to me that the protection which the glasses afford the eyes from wind and dirt will be more than a balance for the dirt that must necessarily accumulate upon the glasses from dust and dirty fingers, etc.

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II and III cannot be fixed. Most diminution is on account of hypermetropia or astigmatism in these men, still a myopia of 3 or more D. might be possible, and if a correction gives perfect vision, or the required standard, such a condition should not exclude an employee.

The Boston and Maine give an examination to all their men once in 2 yrs., sometimes oftener. They never promote a fireman if he is obliged to wear glasses to bring his vision up to normal, but will allow him to retain his position. Until recently they did not allow the engineers to do so; now they do. I personally think that is perfectly safe and just as well.

Myopia of over 4 D. ought to incapacitate.

As long as the low V. is entirely dependent upon an error in refraction, which glasses correct, no minimum is needed.

Name.	Question I.	Question II.	Question III.	Question IV.	Question V.	Question VI.
Herbert, J. Fred.	Emphatically Yes	Yes, 75%	See Remarks	Yearly	1/10 of 1%	Positively
Herron, J. T.	Yes	Yes	1/2 or less	6 mos.	Very small %	Yes
Hess, Wm. L.	Yes	Yes	20/30	6 mos.	None in 5 yrs.	Yes
Hawley, Clark W.	Only on branch lines, not on mail or fast lines	Yes	20/30 to 20/40	Below 40, 5 yrs.; above 40, 2 yrs.		As above mod- ified as to main lines
Holmes, C. R.	Yes, if ref. error is of moderate degree	See Remarks	See ans. No. 2	6 mos.	Very, very small	Yes, limited by ans. No. 1 & 2
Holmes, Geo. J.	Yes	Yes	20/20 in one eye at least for ex- press and pas- senger trains	6 mos.	Very small	Yes, fully
Holt, E. E.	Yes	Yes	0.7	Yearly at least	Less than 1%	Yes
Hood, T. C.	Yes	No	See Remarks	6 mos.	5%	Yes
Hoople, Heber N.	Yes	Yes	2/10 or 3/10	Yearly	1/4%	Yes
Hopkins, E. K.	Yes	Yes	20/70	6 mos.	23%	Yes
Howe, Lucien	Depends on de- gree V. is below required stand.	Yes	Not below 6/10 in one	Yearly	Difficult to say	Not unless word "below" is qual- ified properly
Hubbell, Alvin A. Oculist L.S. & M.S. R.R.	Yes	No		Yearly	Very small	Yes
Hughes, M. A.	Yes	Yes	5/6	4 mos.	1 in 200	Yes
Hulen, Vard H.	Yes— See Remarks	Yes	20/40 both eyes open	6 mos.	1 in 500	Yes
Hunter, D. W.	See Remarks	Yes	20/50	Yearly	Not worth con- sidering	Yes
Jack, Edwin E.	Yes	Yes	5/12 each eye	6 mos.	1/5%	Yes
Jackson, Edward	Yes	Yes	20/100	3 yrs.	.005% or less	Yes
James, J. H.	Yes	Yes	20/70	Yearly	2%	Yes
Jameson, Geo. C.	Yes	Yes	6/15	6 mos.	5%	Yes
Jamieson, T. H.	Yes	Yes	20/80	Yearly	1 to 1000	Yes
Jennings, J. E.	Yes	Yes	20/30 one; 20/40 other	3 yrs.	1%	Yes
Johnson, Walter B.	Yes	Not if gl. make V. normal	V. sufficiently good for ordi- nary use	Yearly	1/10 of 1%	Yes
Johnston, Richard H.	Yes	No		Yearly	1%	Yes
Jonas, A. F.	I would	Yes	20/20 - 30/30	6 mos. to 2 yrs.	Don't know	I can
Kahn, D. L.	Yes	Yes	20/40	6 mos.	-1%	Yes
Kalish, Richard	I would	Yes	20/40	6 mos.	No %	Yes
Kamerly, Jr., E. F.	Yes	No	No limit with perfect V.	Depends on age and kind of ref. Yearly at least	1/10 of 1%	Yes
Kanne, A. J.	Yes	Yes	5/10	6 mos.	-1/10%	Yes
Keiper, Geo. F.	Yes	Yes	20/40	Yearly	Very few	Yes
Kellogg, Francis B.	Yes	Yes	Roughly, 6/24	6 mos.	1%	Yes
Kelly, B. C.	Yes	Yes	20/30	Yearly	2%	Yes
Kennon, B. R.	Yes	Yes	20/50	Yearly	-1% in rims	Yes
Kierulff, B. F.	Yes	Yes	20/30	6 mos.	1%	Yes
Kilburn, Henry W.	Yes	See Remarks	See Remarks	6 mos.	2%	Yes
Kimble, L. E.	Yes			6 mos.	1% in rims	Yes
King, G. L.	Yes			6 mos.	1 to 500	Yes
Kirkendall, John S.	Yes	+4 D A. or Hy.		Yearly	1/2% in rims	Yes
Kirkpatrick, S.	Yes	Yes	20/200	Yearly	-1%	Yes
Kestler, O. F.	Yes	Yes	10/20	6 mos.	-1%	Yes
Klinedinst, J. F.	Yes	Yes	15/30	Yearly	4%	Yes
Knapp, Arnold	Yes	No		Depends on case		Yes, except to the frequency of re-examination If a perfect field in either eye is required
Knapp, Hermann	Yes	Yes	20/30	6 mos.	Don't know	Yes
Kniskern, E. L.	Yes	Yes	20/60	6 mos.	None in rims	Yes
Knox, R. W.	Yes	Yes	1/2 either eye	Yearly	No data	Yes
Koenig, C. J.	Yes	No		6 mos.		Yes

To be continued in March number.

Question VI.

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## Remarks

I would not consider any amount, no matter how low, provided the V. could be brought up to normal or nearly to that point.

No standard of V. less than 20/20 secured without glasses or by corrective glasses of moderate strength should be allowed—for instance, a hypermetrope of +1. D. might only have V.=20/40 without correction at 50 yrs. of age. This would be unsafe in an emergency. Other instances of myopia and astigmatism of low degree would readily occur to you where the V. without corrective lenses is surprisingly low.

A railway engineer patient of mine, age 47, is myopic; has without glasses R. V.=9/200; with -3.25 -1.75, 145=20/30. L. V.=20/60; with -1.75 -0.50, 35°=20/30+; service 15 yrs. I consider him a safe man.

If classes fitted by oculist and kept under oculist's observation.

Experience should count against a moderate reduction of V., which can be brought up to standard by glasses.

No man can be counted safe on a railroad that does not encourage its employees to have the best vision they can obtain and to acknowledge their visual defects.

My theory has always been that if glasses bring one's V. up to 20/20, so far as V. is concerned, he is just as good a man as the man who has 20/20 without specs.

It is my opinion that if the vision can be brought up to the required standard by the use of glasses, no minimum standard of diminution of vision is demanded, provided there is no ocular disease.

I think the amount of ametropia is the question at issue, and I can see where an employee could have normal vision and yet have an error that would disqualify him from such positions, for example, I have a patient who sees 20/20 in either eye, whose maximum amount of ametropia is, under atropin, R. +9.00 +4.50, 180°; L. +8.50 +5.00, 170°. And I would suggest, regarding the accepting of new employees, that they should be examined by an oculist under a mydriatic in order to know the maximum amount of error, unless they allow the adjustment of glasses to all employees in their service.

Believe the railroads and public will be imperfectly served if old employees are removed because of lowered visual acuity which can be restored to normal with glasses. There is no more danger surely that a pair of rimmed glasses will be broken on an engine than that the engineer should become disabled from some other cause, and certainly a second pair of glasses would instantly remedy the trouble. I would be more inclined to reject myopes than hyperopes.

We do not allow enginemen or firemen on our road to use glasses, but a careful consideration of the matter recently has convinced me that glasses should be allowed.

To be continued in March number.

## OBITUARY.

LOUIS DE WECKER.

On January 24th last the career of another of the foremost teachers and practitioners of ophthalmology of our time, Dr. L. de Wecker of Paris, was ended. Though German by birth and education, he settled in Paris at an early time of his illustrious professional life and was one of the foremost French ophthalmologists. His contributions to ophthalmic science have been very numerous and of the best. His large, "complete" text-book is well known, probably also, to the younger men in the profession. He was a very successful practitioner and surgeon, and honors were heaped upon him by his confrères and by the patients in high walks of life who seem to have never been wanting from his clientèle. His name and memory will not die.

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## REVIEW.

THE OPHTHALMOSCOPE AND HOW TO USE IT, By JAMES THORINGTON, A.M., M.D. 73 illustrations and 12 colored plates. Philadelphia, 1906: P. Blakistons Son & Co.

This is a handy text-book in which the student will find chapters on the ophthalmoscope, optics, anatomy and anomalies of the eye. Numerous illustrations and good plates of the appearance of the fundus in different diseases add to its usefulness. It is a good and safe guide for students.

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